

WHAT IS CLAIMED IS:

1 *sub 2* 1. A method of fabricating substrates, the method comprising
 2 providing a substrate comprising a film of material characterized by a non-
 3 uniform surface, the non-uniform surface including a plurality of defects, at least some of
 4 the defects being of a size ranging from about 100 Angstroms and greater;
 5 applying a combination of a deposition species for deposition of a
 6 deposition material and an etching species for etching an etchable material, the
 7 combination of the deposition species and the etching species contacting the non-uniform
 8 surface in a thermal setting to reduce a level of non-uniformity of the non-uniform surface
 9 by filling a portion of the defects to smooth the film of material, the film of material being
 10 substantially free from the defects and being characterized by a surface roughness of a
 11 predetermined value.

1 2. The method of claim 1 wherein said thermal setting increases a
 2 temperature of said non-uniform surface to about 1,000 Degrees Celsius and greater.

1 3. The method of claim 2 wherein said temperature increases is about
 2 10 Degrees Celsius per second and greater.

1 4. The method of claim 2 wherein said temperature increases is about
 2 20 Degrees Celsius per second and greater.

1 5. The method of claim 1 wherein non-uniform surface comprises a
 2 plurality of particles therein, the particles comprising a hydrogen bearing species.

1 6. The method of claim 5 wherein said plurality of particles are
 2 derived from hydrogen gas during an implantation process.

1 7. The method of claim 1 wherein said predetermined value is less
 2 than about two nanometers root mean square.

1 8. The method of claim 1 wherein said predetermined value is less
 2 than about 1 nanometers root mean square.

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- 1 9. The method of claim 1 wherein said predetermined value is less
2 than about 0.1 nanometer root mean square.
- 1 10. The method of claim 1 wherein said etching species comprise a
2 hydrogen bearing compound.
- 1 11. The method of claim 1 wherein said etching species comprising a
2 halogen bearing compound is selected from at least Cl_2 , HCl , HBr , HI , and HF .
- 1 12. The method of claim 1 wherein said etchanting species comprise a
2 fluorine bearing compound.
- 1 13. The method of claim 12 wherein said fluorine bearing compound is
2 selected from SF_6 , CF_4 , NF_3 , and CCl_2F_2 .
- 1 14. The method of claim 1 wherein said deposition species comprise a
2 silane bearing gas.
- 1 15. The method of claim 1 wherein said deposition species comprise a
2 silicon bearing species.
- 1 16. The method of claim 1 wherein said deposition species comprise a
2 species selected from SiH_4 , $\text{Si}_x\text{Cl}_y\text{H}_z$, and SiCl_x .
- 1 17. The method of claim 1 wherein the non-uniform surface is a
2 cleaved surface, the cleaved surface being made from a process selected from a controlled
3 cleaving action, a Smart CutTM process, or an ELTRANTM process.
- 1 18. The method of claim 1 wherein the defects are called HF defects.

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